

CLAIMS:

1. An immunogenic peptide having contiguous amino acids derived from the MART-1 sequence (SEQ ID NO: 2).

2. The immunogenic peptide of claim 1, wherein said peptide sequence contains at least one amino acid modification of said MART-1 sequence to enhance binding of peptide to an MHC molecule.

3. The immunogenic peptides of claim 2 wherein such peptides are at least about 9 to 10 amino acids in length.

4. The peptide of claim 3, wherein said modification includes at least one amino acid substitution in said peptide sequence.

5. The peptide of claim 4, wherein said amino acid substitution is located at a position selected from the group consisting of: (i) the first position, (ii) the second position, (iii) the third position, (iv) the ninth position, (v) tenth position and (vi) combinations of at least two of (i) - (v) in the sequence of the peptide.

6. The peptide of claim 5, wherein said amino acid substitution are located at the second and ninth positions.

7. The immunogenic peptide of claim 1 where said peptide has the sequence selected from the group consisting of (i) AAGIGILTV (SEQ ID NO: 4), (ii) EAAGIGILTV (SEQ ID NO: 17), (iii) AAGIGILTVI (SEQ ID NO: 18) and an analog of any one (i) - (iii).

8. The peptide of claim 7, wherein said peptide is AAGIGILTV.

9. An immunogenic peptide having the formula $X_1X_2X_3IGILTX_4$, wherein:

X_1 may be any amino acid;

X_2 may be any hydrophobic aliphatic amino acid;

X_3 may be any amino acid; and

X_4 may be any hydrophobic aliphatic amino acid.

10. The peptide of claim 9 wherein X_1 is selected from the group consisting of methionine, leucine, alanine, glycine, threonine, isoleucine, tyrosine, valine, tryptophan, phenylalanine, serine, lysine or aspartic acid.

11. The peptide of claim 9 wherein X_2 is selected from the group consisting of methionine, leucine, alanine, glycine, isoleucine, valine or threonine.

12. The peptide of claim 9 wherein X_3 is selected from the group consisting of methionine, leucine, alanine, glycine, threonine, isoleucine, tyrosine, valine, tryptophan, phenylalanine, lysine, serine or aspartic acid.

13. The peptide of claim 9 wherein X_4 is selected from the group consisting of methionine, leucine, alanine, glycine, isoleucine, valine or threonine.

14. The peptide of claim 9 wherein said peptide has a sequence shown in Table 14.

15. An immunogenic peptide having contiguous amino acids derived from the gp100 sequence (SEQ ID NO. 27).

16. The immunogenic peptide of claim 15 wherein said peptide is at least about 9 to 10 amino acids in length.

17. The immunogenic peptide of claim 16 having the sequence KTWGQYWQV (SEQ.ID.NO:46), KTWGQYWQVL (SEQ ID NO:47), ITDQVPFSV (SEQ ID NO:48) and TITDQVPFSV (SEQ ID NO:49).

18. The immunogenic peptide of claim 16 wherein the peptide is selected from the group consisting of LLDGTATLRL (SEQ ID NO: 33), VLYRYGSFSV (SEQ ID NO: 34), VLKRCLLHL (SEQ ID NO: 36), ALDGGNKHFL (SEQ ID NO: 35), VLPSPACQLV (SEQ ID NO: 37), YLEPGPVTA (SEQ ID NO: 40), and SLADTNSLAV (SEQ ID NO: 38).

19. The immunogenic peptide of claims 16, 17, 18 wherein said peptide contains at least one amino acid modification of said gp100 sequence.

20. The peptide of claim 19, wherein said modification includes at least one amino acid substitution in said peptide sequence.

21. The peptide of claim 19, wherein said amino acid substitution is located at a position selected from the group consisting of: (i) the first position, (ii) the second position, (iii) the third position, (iv) the ninth position, (v) tenth position and (vi) combinations of at least two of (i) - (v) in the sequence of the peptide.

22. An immunogenic peptide having the a formula selected from the group consisting of $X_1X_2X_3QYWQX_4$, $X_1X_2X_3QVPFSX_4$ and $X_1X_2X_3PGPVTX_4$ wherein:

X_1 is any amino acid;

X_2 is any hydrophobic aliphatic amino acid;

X₃ is any amino acid; and
X₄ is a hydrophobic aliphatic amino acid.

23. The peptide of claim 22 wherein the amino acid for X₁ is selected from the group consisting of methionine, leucine, alanine, glycine, threonine, isoleucine, valine, tyrosine, serine, tryptophan, phenylalanine, serine, lysine or aspartic acid.

24. The peptide of claim 22 wherein X₂ is selected from the group consisting of methionine, leucine, alanine, glycine, isoleucine, valine or threonine.

25. The peptide of claim 22 wherein X₃ is selected from the group consisting of methionine, leucine, alanine, glycine, threonine, isoleucine, tyrosine, valine, tryptophan, phenylalanine, serine, lysine or aspartic acid.

26. The peptide of claim 22 wherein X₄ is selected from the group consisting of methionine, leucine, alanine, glycine, isoleucine, valine or threonine.

27. The immunogenic peptide of any of claims 1, 9, 15 or 22 wherein said peptide is recognized by HLA-A2 restricted tumor infiltrating lymphocyte.

28. The immunogenic peptide of any one of claims 1, 9, 15 or 22 wherein said peptide is a native, synthetic or recombinant peptide.

29. A pharmaceutical composition comprising the peptides of any one of claims 1, 9, 15 or 22 and an acceptable excipient, diluent or carrier.

30. A method of preventing or treating melanoma comprising administering the pharmaceutical composition of claim 29 to a mammal in an effective amount to stimulate the production of protective antibodies or immune cells.

31. A vaccine for immunizing a mammal comprising a peptide according to any one of claims 1, 9, 15 or 22 in a pharmacologically acceptable carrier.

32. A purified and isolated nucleic acid sequence encoding a peptide according to any one of claims 1, 9, 15 or 22.

33. A recombinant expression vector comprising at least one nucleic acid sequence of any one of claims 1, 9, 15 or 22.

34. The method of claim 33, wherein the expression vector is a eukaryotic expression vector or prokaryotic expression vector.

35. A host organism transformed or transfected with the recombinant expression vector according to claim 33 in a manner to allow expression of said protein encoded by said recombinant expression vector.

36. Antibodies reactive with the immunogenic peptide according to claims 1, 9, 15 or 22.

37. The antibodies of claim 36 wherein said antibodies are monoclonal.

38. The antibodies of claim 37 wherein said antibodies are polyclonal.